UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Monterey Bay National Marine Sanctuary
299 Foam Street
Monterey, California 93940

DATE: 02/25/08

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SUBJECT: F/V *Lou Denny Wayne* vessel grounding and recovery assessment

TASK CODE: 1CK3H58-PER F/V *Lou Denny Wayne*

NAME AND DESCRIPTION OF VESSEL: F/V *Lou Denny Wayne*, 37-foot wooden-hull, crab fishing vessel

VESSEL OWNER: Leonardo J. Morelli of Santa Cruz

VESSEL OPERATOR: Leonardo J. Morelli of Santa Cruz

DATE AND TIME OF INCIDENT: 11/29/07 at 0130 hours

LOCATION OF GROUNDING: Approximately 1.4 miles SE of Pigeon Point, California

LAT/LONG POSITION: 37 deg 10'N, 122 deg 22'W

Damage assessment and site characterization of the rocky shore following the grounding and recovery of the F/V *Lou Denny Wayne*

February 25, 2008

MBNMS Staff
Research: Steve Lonhart, Erica Burton, Andrew DeVogelaere, Jean de Marignac, Hugo Selbie
Resource Protection: Scott Kathey

Introduction

On November 29, 2007 at approximately 0130 hours the F/V LOU DENNY WAYNE (hereafter LDW) ran aground one mile south of Pigeon Point, San Mateo County, California (Figs. 1, 2). Coast Guard Sector San Francisco, in close coordination with NOAA (the Monterey Bay National Marine Sanctuary), the Office of Spill Prevention and Response (California Department of Fish and Game) and the San Mateo County Sheriff Department, worked with Parker Diving to remove the diesel fuel on board the LDW since it was considered a substantial threat to the environment. The vessel owner estimated up to 600 gallons of diesel fuel was on board the vessel at the time of the incident and an estimated 370 gallons of diesel fuel were recovered from the LDW.

Research staff from the Monterey Bay National Marine Sanctuary (MBNMS) made several visits to the grounding site of the LDW. The initial visit occurred at 0830 on November 30, 2007. Tidal conditions during the initial visit were not optimal for a research survey. Plans were subsequently made to revisit the site during low (or minus) tides to better access the wreck and impacted area. Second and third visits by research staff were made on December 6 and December 22, 2007, seven and twenty-three days after the incident, respectively. The goal of these latter two visits was to assess the status of natural resources (both biological and geological) within and adjacent to the grounding site of the LDW.

The purpose of this report is to summarize research methods, observations and general findings.

Methods

Three methods to collect data were used by MBNMS research staff: visual inspection with on-site notes, digital photographs, and quantitative transects.

Visual inspection

On December 6, 2007 researchers recorded direct observations of the site, including the types of debris remaining, evidence of diesel fuel, and physical damage to the rocky shore itself. Information was collected for the site as a whole, and specifically at the site of impact.

Digital photographs

During both site visits, numerous digital photographs were taken of the site. These included overview images from atop the cliffs and close-ups of the rocky intertidal and sandy beach. On December 22, 2007 photos were also taken of the three vertical transects, covering the entire length of the transect to a width of about 1 m. Photographs were taken while standing adjacent to the transect, centering the line in the middle of the image.

Transects

Vertical transects were sampled using the uniform point contact (UPC) technique. Points along the transect were sampled at an interval of 0.5 m, starting at the 30 m end (seaward edge) and ending near 0 m (shoreward edge) along the intertidal (length of transect varied slightly). At each point data are collected to determine relative abundance (% cover) of species occupying primary space. Relative abundance data are collected by identifying the taxon that falls directly under a point, including abiotic features (e.g., bare rock, cobble, sand, and tar). In this study of the LDW site, information on layering (i.e. multiple taxa occupying the same point) was not collected; only the primary space occupier was recorded.

On December 6, 2007 researchers laid three transects running perpendicular from shore to sea (Fig. 3). The 0 m end of the transect tape was anchored at the transition zone where solid rocky shore was covered by the start of the beach. The transect tape was laid perpendicular to shore on a heading of 210 degrees. The transect tape was loosely draped over the surface and extended out 30 m or until the rocky shore was submerged, whichever came first. Once the transect was in place, Dr. Steve Lonhart observed what was under each 0.5 m point and called out the taxon for Erica Burton to record on a data sheet. Three transects were completed in this manner, one at the site of impact, one adjacent to the site of impact, and one roughly 30 m to the south of the impact site as an undisturbed reference.

On December 22, 2007 the same UPC method was used but only Dr. Lonhart was present to record information. The two transects near the impact site were repeated but the undisturbed reference was at a slightly different location.

Results and Discussion

Visual inspection

On December 6, 2007 research staff from MBNMS evaluated the site from 1400 to 1530 hr when the tidal height was -0.23 ft at 1438 at Ano Nuevo Island (Fig. 4). During the first 30 min a contracted helicopter hauled away three net loads, and shortly thereafter the rest of the cleaning crew left the scene (Fig. 5). The boat's engine had just been removed and some residual diesel spilled during transportation (Scott Kathey, personal communication). A slight sheen was visible on the surface of the water closest to shore, and it was also evident in at least one small tidepool (<1 m^2) where there was a strong smell of fuel and an oily sheen (Fig. 6).

Initially researchers inspected the area where the majority of wreckage had been according to Scott Kathey and the clean-up supervisor/company owner. Researchers estimate 10 m^2 of freshly broken sedimentary rock was exposed. Weathered rock was dark or dull in appearance with worn/smoothed edges, whereas newly exposed rock was lighter in color, had evidence of sharp edges and was free of attached epibionts (Fig. 7). Nearly 5 m^2 of surf grass was exposed at this time at the site of the boat grounding.

Black turban snails *Tegula funebralis*, up to ~100 per 0.25 m^2, were very common in both impact site and adjacent areas. The ochre star *Pisaster ochraceus* (not very large [<15 cm diameter], purple and orange color morphs) was also observed in and beyond the impact site. The California mussel *Mytilus californianus* was not observed. The green alga *Codium setchellii* was noted in one patch (20 cm long, 5 cm wide). Owl limpets *Lottia gigantea*, <5 per m^2, were mostly medium-sized and found in both the impact site and adjacent areas. The sea palm *Postelsia palmaeformis* was present on offshore rocks, beyond an area where the green rope and white floats from the LDW were wrapped around rocky outcrops.

Digital photographs

All images were taken with digital cameras and subsequently downloaded and stored by research staff (available upon request).

Transects

On December 6, 2007 researchers laid three transects running perpendicular from shore to sea. The LDW had settled into a channel very close to shore. Researchers placed transect 1 on the southern side of the channel in an area that was less impacted (qualitatively) than the northern side of the channel (Fig. 8). Transect 2 was on the northern side of the channel, an area that appeared to have the highest amount of freshly broken rock, both as cobble pieces and as newly exposed rocky shore (Fig. 9). Transect 3 was on the southern side of the main cove, 30 m south of transect 1 and further away from the impact site than transect 1; this served as an undisturbed reference (Fig. 10). Percent cover data are summarized in Table 1.

Recalling that transect 2 is closest to the channel where the LDW was grounded for seven days, it is not surprising that the percent of bare rock was highest (20%) as compared to background levels of 5% near the channel (but with no visual signs of damage) and 2% bare rock cover well away from the channel. During this survey no distinction was made between weathered and "new" bare rock.

Transect 2 also differed from the other transects based on the percent cover of both the erect (diploid) and encrusting (haploid) forms of *Mastocarpus* spp. It is possible that physical damage from the LDW removed the erect form and exposed more of the encrusting form, but this hypothesis requires further testing. Specifically, in areas with intact, erect forms of *Mastocarpus* the amount of the encrusting form underneath needs to be measured. The percent cover of cobble was also three times in transect 2, and much of that was newly formed. The absence of *Phyllospadix* in transect 2 is likely not the result of LDW damage, but is instead due to the placement of the transect itself, which was mostly on a slight ridge, and area unlikely to support the surf grass. Other differences in percent cover between the transects can be explained by natural variation and sampling artifacts.

On December 22, 2007 the same UPC method was used but only Dr. Lonhart was present to record information. Transects 1 and 2 were placed as close as possible to the same locations used on December 6th, while transect 3 was not in the same reference area, but instead moved slightly closer to the impact site (still 20 m south of it) and onto a larger patch of reef. Because the tide was considerably lower on December 22nd, more of the intertidal reef was exposed. All transects started at the beach-reef interface and extended as far as possible towards the sea (maximum of 30 m). Percent cover data are summarized in Table 2.

The percent cover for most taxa did not differ substantially between survey periods (Table 2). Transect 2, at the impact site, again had high percentage of the encrusting form of *Mastocarpus* spp. (25%) and both weather-worn (i.e. old) bare rock (24%) and new bare rock (15%). The overall percent cover of bare rock increased between sampling periods. The mechanism for this increase is unknown. There was also still a lower percent cover of erect *Mastocarpus* spp. in the impact area.

A comparison of percent cover values from December 6th and 22nd (impact site only) show few differences except for bare rock, cobble, and sand (Table 3). As discussed earlier, the differences in percent cover of bare rock are substantial (20% vs. 39%) between dates but not easily explained. The percent cover of cobble declined nearly three-fold and sand declined from 10% to 2%. Changes in small, movable components (e.g., sand, gravel, cobble) are expected

given wave dynamics and tidal changes. Percent cover of sand at both the reference sites (transects 3, both dates) were closer to 10% than 2% (Tables 1 and 2).

General Findings

Damage from the grounding and recovery appeared to be minimal (e.g., approximately 10 m^2 of freshly broken sedimentary rock exposed at low tide; slight differences in percent cover of algae and invertebrates between survey transects). A diesel sheen was present in tidepools and the surrounding area during the December 6 survey. Small pieces of trash were also observed in the subtidal and wash zones. The site will be revisited in the future to monitor changes at the three transects.

Table 1. Percent cover for three transects based on a uniform point contact method covering 30 m from shore out to sea at a 0.5 m interval. Transect 1 was just south of the impact site (n=55), transect 2 was on the edge of the impact site (n=59), and transect 3 was 30 m south of the impact site and served as an undisturbed reference (n=43). Survey completed December 6, 2007.

Genus/Taxon	Species	Common name	Transect 1	Transect 2	Transect 3
Anthopleura	*sola*	anemone	1.82	0.00	0.00
Bare rock		substrate	5.45	20.34	2.33
Bare rock (new)		substrate	0.00	0.00	0.00
Bare rock (old)		substrate	0.00	0.00	0.00
Chondracanthus	*corymbiferus*	algae	1.82	0.00	2.33
Chondracanthus	*canaliculatus*	algae	0.00	0.00	0.00
Cobble		substrate	5.45	15.25	4.65
Corraline crust		algae	3.64	8.47	9.30
Corraline crust (dead)		algae	0.00	0.00	0.00
Corraline erect		algae	1.82	0.00	0.00
Endocladia	*muricata*	algae	5.45	1.69	2.33
Gastroclonium	*subarticulatum*	algae	9.09	3.39	16.28
Mastocarpus[1]	*papillatus* (2N erect)	algae	27.27	6.78	13.95
Mastocarpus[1]	*papillatus* (1N crust)	algae	18.18	28.81	11.63
Mazzaella	*splendens*	algae	9.09	5.08	13.95
Phragmatopoma	*californica*	polychaete	3.64	0.00	4.65
Phyllospadix	spp.	surfgrass	5.45	0.00	6.98
Prionitis	spp.	algae	0.00	0.00	2.33
Red alga, fleshy branch		algae	1.82	0.00	0.00
Red turf		algae	0.00	0.00	0.00
Sand		substrate	0.00	10.17	9.30
			100.00	100.00	100.00

[1]*Mastocarpus papillatus* is listed but this taxon is actually a combination of *M. papillatus* (mostly) and *M. jardinii*, a closely related and morphologically very similar congener.

Table 2. Percent cover for three transects based on a uniform point contact method covering 30 m from shore out to sea at a 0.5 m interval. Transect 1 was just south of the impact site (n=61), transect 2 was on the edge of the impact site (n=59), and transect 3 was 30 m south of the impact site and served as an undisturbed reference (n=55). Survey completed December 22, 2007.

Genus/Taxon	Species	Common name	Transect 1	Transect 2	Transect 3
Anthopleura	*sola*	anemone	0.00	0.00	1.82
Bare rock (new)		substrate	0.00	15.25	0.00
Bare rock (old)		substrate	6.56	23.73	5.45
Chondracanthus	*canaliculatus*	algae	4.92	0.00	7.27
Chondracanthus	*corymbiferus*	algae	0.00	0.00	3.64
Cobble		substrate	6.56	6.78	5.45
Corraline crust		algae	6.56	8.47	5.45
Corraline crust (dead)		algae	0.00	1.69	0.00
Corraline erect		algae	3.28	0.00	3.64
Endocladia	*muricata*	algae	11.48	0.00	3.64
Gastroclonium	*subarticulatum*	algae	4.92	0.00	10.91
Mastocarpus[1]	*papillatus* (2N erect)	algae	16.39	5.08	10.91
Mastocarpus[1]	*papillatus* (1N crust)	algae	18.03	25.42	14.55
Mazzaella	*splendens*	algae	8.20	3.39	7.27
Phragmatopoma	*californica*	polychaete	4.92	5.08	1.82
Phyllospadix	spp.	surfgrass	3.28	3.39	7.27
Prionitis	spp.	algae	1.64	0.00	0.00
Red turf		algae	1.64	0.00	3.64
Sand		substrate	1.64	1.69	7.27
			100	100	100

[1]*Mastocarpus papillatus* is listed but this taxon is actually a combination of *M. papillatus* (mostly) and *M. jardinii*, a closely related and morphologically very similar congener.

Table 3. Comparing percent cover data for both transects surveyed at the impact site of the LDW. The same area was surveyed on December 6th and 22nd, and percent cover estimates using UPC methods are listed below. See Tables 1 and 2 for further details.

			Dec 6.2007	Dec 22.2007
Genus/Taxon	Species	Common name	Transect 2	Transect 2
Anthopleura	*sola*	anemone	0	0
Bare rock		substrate	20.34	0.00
Bare rock (new)		substrate	0	15.25
Bare rock (old)		substrate	0	23.73
Chondracanthus	*canaliculatus*	algae	0	0
Chondracanthus	*corymbiferus*	algae	0	0
Cobble		substrate	15.25	6.78
Corraline crust		algae	8.47	8.47
Corraline crust (dead)		algae	0	1.69
Corraline erect		algae	0	0
Endocladia	*muricata*	algae	1.69	0
Gastroclonium	*subarticulatum*	algae	3.39	0
Mastocarpus	*papillatus* (1N crust)	algae	28.81	25.42
Mastocarpus	*papillatus* (2N erect)	algae	6.78	5.08
Mazzaella	*splendens*	algae	5.08	3.39
Phragmatopoma	*californica*	polychaete	0	5.08
Phyllospadix	spp.	surfgrass	0	3.39
Prionitis	spp.	algae	0	0
Red turf		algae	0	0
Sand		substrate	0	0
			100	100

Figure 1. F/V *Lou Denny Wayne* grounding, approximately 1.4 miles SE of Pigeon Point, California (12/03/07).

Figure 2a. Grounding site of F/V *Lou Denny Wayne* (red box), approximately 1.4 miles SE of Pigeon Point, California.

Figure 2b. Grounding site of F/V *Lou Denny Wayne* (red arrow), approximately 1.4 miles SE of Pigeon Point, California.

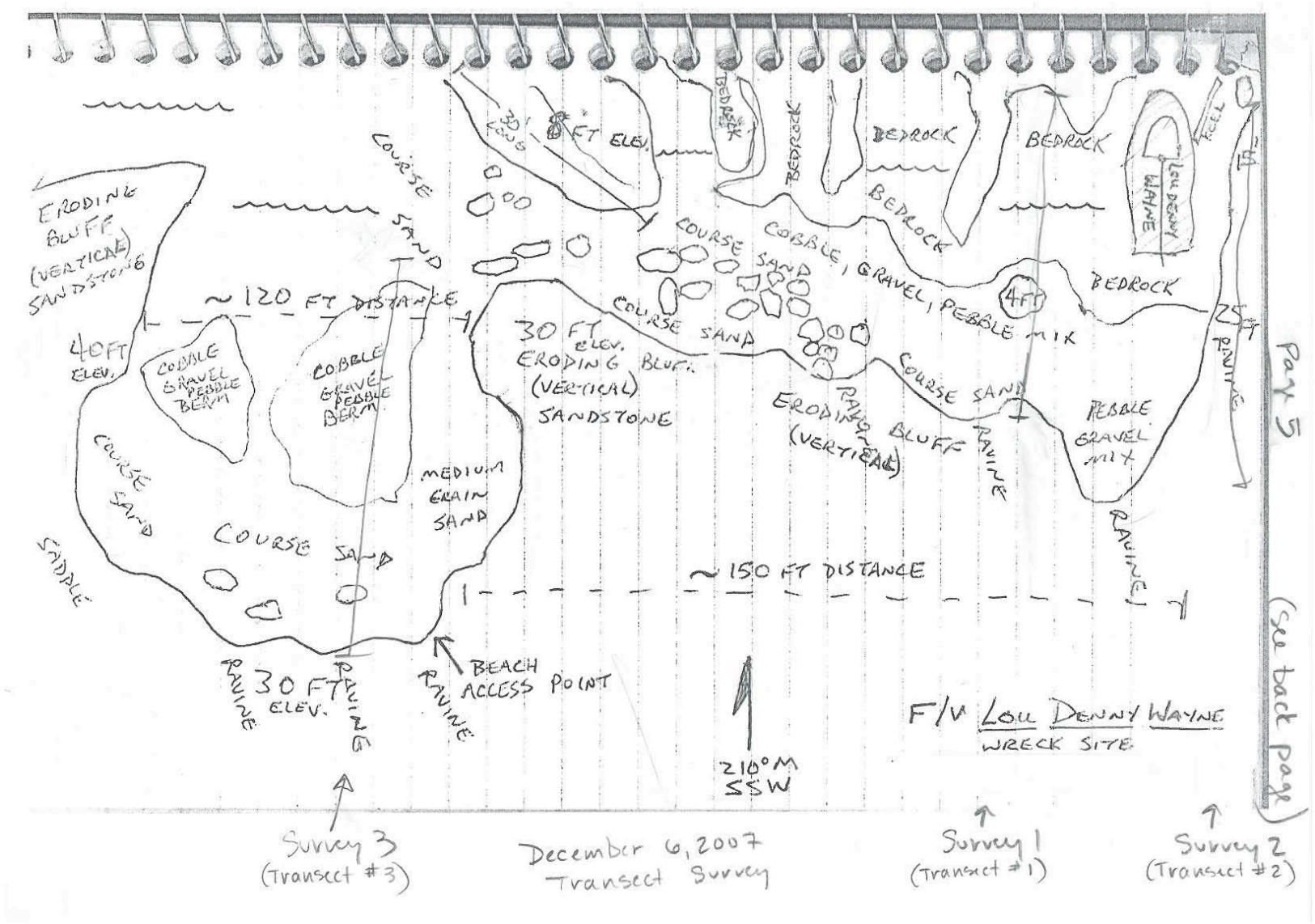

Figure 3. Transect survey (12/06/07) of the F/V *Lou Denny Wayne* grounding, 1 mile south of Pigeon Point, CA.

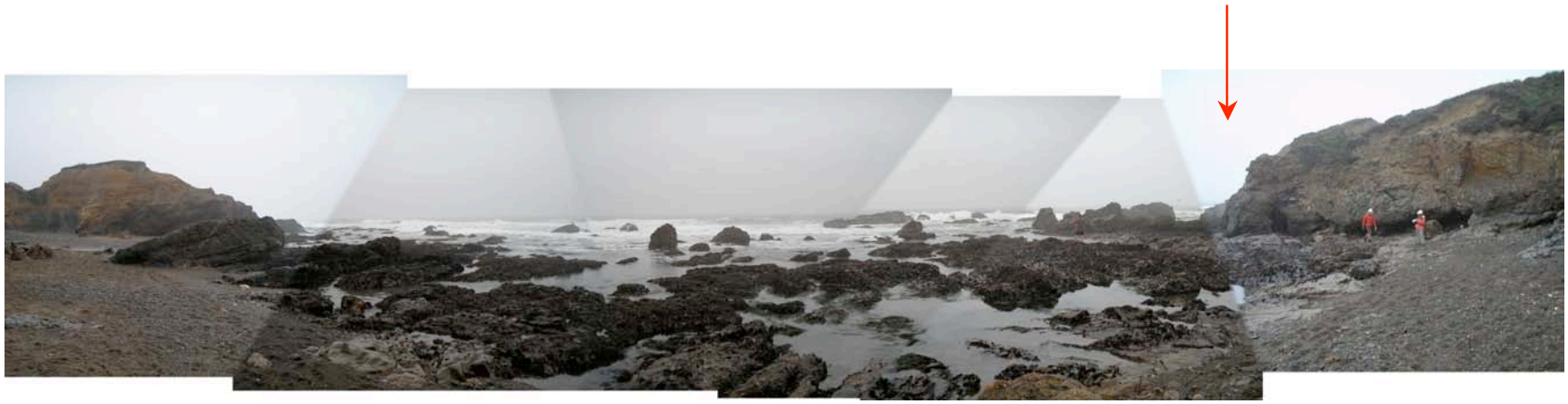

Figure 4. Panoramic view of rocky shore survey area and F/V *Lou Denny Wayne* grounding site (indicated by red arrow).

Figure 5. Removal of trash from F/V *Lou Denny Wayne* grounding site (12/06/07).

Figure 6. Oil sheen at F/V *Lou Denny Wayne* grounding site (12/06/07).

Figure. 7. Broken sedimentary rock at F/V *Lou Denny Wayne* grounding site (12/06/07).

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Figure 8. Transect #1 on southern side of channel. An area that appeared to be less impacted than the northern side of channel (12/06/07).

Figure 9. Transect #2 on northern side of channel, at edge of impact site, in an area that appeared to have the greatest amount of freshly broken rock (12/06/07).

Figure 10. Transect #3 on southern side of main cove served as undisturbed reference site (12/06/07).